A.2.3 PLANETARY GEOLOGY AND GEOPHYSICS

1. Scope of Program

The Planetary Geology and Geophysics (PG&G) program supports scientific investigations of the planetary surfaces and interiors, satellites (including the Moon), satellite and ring systems, and smaller solar system bodies such as asteroids and comets. The goals of the PG&G program are to foster the gathering, synthesis, analysis, and comparative study of data that will improve the understanding of the extent and influence of planetary geological and geophysical processes on the bodies of the solar system, the origin and evolution of the solar system, and the nature of Earth and its history in comparison to other planets.

The PG&G program supports research investigations relevant to the scientific interpretation of data from past and existing planetary missions that are now in the public domain, and to the science objectives of future missions. These investigations involve several types of research efforts such as, but not limited to: analysis and synthesis of existing data; theoretical and numerical modeling of data and processes; generation of new basic data in a laboratory or field environment; and combinations of these kinds of activities. Examples of the kinds of research supported by this program include:

- Direct analysis of released data from planetary missions;
- Theoretical modeling of geologic and geophysical processes;
- Photogeologic analysis and geologic interpretation of planetary surfaces;
- Compositional and geologic mapping of planetary surfaces;
- Laboratory and remote sensing studies (Please note that the PG&G Program does not support the collection of telescopic data);
- Experimental studies of materials under conditions relevant to objects in the solar system;
- Theoretical studies of the interiors of planetary bodies;
- The dynamical evolution of the planets, satellites, small solar-system bodies, and ring systems;
- Geologic field studies of terrestrial analogs to planetary phenomena in the context of providing a better understanding of the planetary phenomena; and
- Studies related to the origin and evolution of volatiles in solid planetary bodies

In addition, the program supports the development and production of cartographic products from planetary data sets. Proposals to study or develop flight instruments or to study future planetary missions are beyond the scope of this program.

Proposed investigations of any planetary or satellite surface that are intended, as a by-product of the scientific research, to produce a geologic map suitable for publication by the U.S. Geological Survey (USGS) should check the relevant box on the proposal *Cover Page* and clearly indicate this intention in the *Proposal Summary,* as well as the text of the proposal. Information on geologic maps that have been produced or are currently in

production may be obtained from Dr. Kenneth Tanaka of the USGS at E-mail: ktanaka@flagmail.wr.usgs.gov, or from the World Wide Web at URL http://wwwflag.wr.usgs.gov/USGSFlag/Space/GEOMAP/PGM_home.html. Investigators who choose to produce geologic maps as a USGS product will be expected to review maps generated by other planetary mappers.

Investigations that produce data may be of wide scientific interest. Therefore, it is expected that these data sets would, after a reasonable amount of time, be archived within the Planetary Data System (PDS). Contact R. E. Arvidson (PDS Geoscience Node) for further information regarding the types of data sets that might be of interest for archiving purposes (E-mail: arvidson@wunder.wustl.edu, or telephone: (314) 935-5609.

Finally, note that to enable the NASA Office of Space Science to properly evaluate the relevance of proposals submitted to its programs, as well as track its progress towards achieving its goals as mandated by the Government Performance Review Act (GPRA), all research supported by NASA's programs must now demonstrate its relationship to NASA Goals and Research Focus Area's (RFA's) as stated in the latest version of its Strategic Plan (follow links from the Web site http://spacescience.nasa.gov/); see also the discussion in Section 1 of the *Summary of Solicitation* of this NRA. Therefore, all proposers to this program element are asked to state their perception of this relevance in terms of the Goals, Science Objectives, and RFA's given in Table 3 found in the *Summary of Solicitation*. In particular, this program element is designed to help fulfill all of the RFA's 1(a), (b), (c) and (d), and 4 (b), (c) and (d). for Goal II of the Solar System Exploration science theme. The appropriate place for this statement of relevancy is in the introduction to the proposal's "Scientific/Technical/Management" section (see Section 2.3.5 in the *Guidebook for Proposers*). The index numbers in this table may be used to identify a specific RFA, for example, "Goal I, Sun-Earth Connection Theme, RFA 1(c)" or "Goal II, Astronomical Search for Origins, RFA 3(b)."

2. Experimental Facilities Available for the PG&G Program

The following facilities are available to investigators supported by the PG&G program. If their use is anticipated, this should be discussed and justified in the submitted proposals (especially note the provision for such discussion in the proposal section entitled *Facilities and Equipment*).

• Planetary Aeolian Facility. The Planetary Aeolian Facility at the NASA Ames Research Center consists of wind tunnels to simulate atmosphere-surface interactions on Earth, Mars, and Venus. For more information contact:

Dr. Ronald Greeley
Department of Geology
Box 871404
Arizona State University

Tempe, AZ 85287-1404
Telephone: (480) 965-7045
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E-mail: greeley@asu.edu

• Reflectance Experiment Laboratory (RELAB). The RELAB facility at Brown University provides a mechanism for researchers to obtain laboratory spectra of geologic materials for use in compositional and/or geologic applications. NASA supports the RELAB as a multiuser spectroscopy facility and laboratory time can be made available at no charge to investigators funded by NASA programs. If your proposed research requires new spectra in the VIS/NIR or mid IR, briefly describe the scope and justification in the proposal. Information on this facility, a *RELAB User's Manual* and sample submittal forms, and access to RELAB spectroscopy data can be found at: http://www.planetary.brown.edu/relab/

For assistance contact:

Dr. Carle M. Pieters
RELAB Science Manager
Department of Geological Sciences
Box 1846
Brown University
Providence, RI 02912-1846
Telephone: (401) 863-2417
Facsimile: (401) 863-3978
E-mail: pieters@mare.geo.brown.edu

• NASA Ames Vertical Gun Range (AVGR). The NASA AVGR is a national facility funded by the NASA Office of Space Science to enable investigations of impact phenomena and processes. Exploratory or proof-of-concept programs requiring a limited number of experiments can be accommodated at no cost. More extensive programs are subject to review in order to assess feasibility and cost effectiveness. For more information, potential users of the AVGR should contact:

Dr. Peter Schultz
Department of Geological Sciences
Box 1846
Brown University
Providence, RI 02912-1846
Telephone: (401) 863-2417
E-mail: peter_schultz@brown.edu

3. Data Sources Available for the PG&G Program

Prospective proposers should be aware of sources for data that might be used in their research and whether the required data are available. Useful contacts for making these determinations are given below:

• General Lunar and Planetary Information. The Lunar and Planetary Institute (LPI) is the most concentrated and readily accessible source of information in lunar and planetary science. Information about its services can be found on the LPI home page on the World Wide Web at URL http://cass.jsc.nasa.gov/lpi.html, and/or contact:

Director
The Lunar and Planetary Institute
3600 Bay Area Boulevard
Houston, TX 77058
Telephone: (281) 486-2180

• Data from Completed NASA Flight Programs. The National Space Science Data Center (NSSDC) stores digital and other data from completed flight experiments. Such data include lunar and planetary photographs, digital planetary images, data from numerous flight experiments, and lunar cartographic products. Investigators are responsible for acquiring the data needed for their proposal. Modest requests for imaging and nonimaging data are free of charge, while charges will be made for large requests. Requests from U.S. investigators for data products and information may be made to:

National Space Science Data Center
Code 633.4
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771-0001
Telephone: (301) 286-6695

while requests from non-U.S. investigators for NSSDC data products and product availability information may be made to:

World Data Center for Rockets and Satellites
Code 633
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771-0001
Telephone: (301) 286-6695

• Planetary Cartographic Products. A variety of planetary cartographic products such as topographic, orthophoto, geological, and other special maps and geodetic information are available. Requests from NASA-funded investigators for production of special maps or other cartographic materials will be accommodated when possible. Request available

data or specific maps from:

Branch of Distribution
U.S. Geological Survey
Federal Center
Box 25286
Denver, CO 80225
Telephone: (303) 236-7477

Request information related to the availability of base maps and materials or U.S. Geological Survey criteria for map publication through URL http://wwwflag.wr.usgs.gov/USGSFlag/Space/GEOMAP/PGM_home.html and/or

Branch of Astrogeology
U.S. Geological Survey
2255 North Gemini Drive
Flagstaff, AZ 86001
Telephone: (520) 556-7262

• Regional Planetary Image Facilities. Regional Planetary Image Facilities (RPIF's) contain nearly half a million images of the planets and their satellites taken both from Earth and manned and unmanned spacecraft, as well as topographic and geologic maps produced from these images. The RPIF's, located at institutions worldwide, are intended for use by individuals and groups who use photographic and cartographic materials of the planets and satellites in their research programs. These programs include geologic, photometric, colorimetric, photogrammetric, and atmospheric dynamical studies.

In addition to the local scientists and their associates who use these data on a daily basis, investigators throughout the world are encouraged to use the RPIF's. Send inquiries to the nearest facility in care of the Director, Regional Planetary Image Facility. Note that while these centers may be used for on-site study and selection of planetary and satellite images, they are not facilities for the production of photographs for users. Instead, such materials may be obtained from the NSSDC at the NASA Goddard Space Flight Center at the address given above. Additional information, including a listing of RPIF locations worldwide, can be found on the RPIF home page at URL http://cass.jsc.nasa.gov/library/RPIF/RPIF.html .

• Digital Planetary Image Data. Digital planetary image data are available through the Planetary Data System. Submit requests for imaging data and support documentation to:

Planetary Data System/Imaging Node
U.S. Geological Survey
2255 North Gemini Drive
Flagstaff, AZ 86001
Telephone: (520) 556-7113

The Planetary Data System/Imaging Node can be found on the World Wide Web at URL http://www-pdsimage.jpl.nasa.gov/PDS/.

Requests for other planetary geoscience data may be submitted to:

Planetary Data System/Geosciences Node
Washington University
Campus Box 1169
One Brookings Drive
St. Louis, MO 63130
Telephone: (314) 935-5493

The Planetary Data System/Geosciences Node can be found on the World Wide Web at URL http://wwwpds.wustl.edu/ .

4. Programmatic Information

Anticipated funding for the PG&G program is approximately $13.5M for Fiscal Year 2004, which is expected to support approximately 160 investigations, including both new proposals and in-progress multiple year awards. Approximately 60 investigations are expected to be selected through this NRA.

As a change from past practices for this program, and in anticipation of a new master data base for OSS research awards that is being implemented on an evolving basis, *Annual Progress Reports* (called "Progress" or "Status" Reports in previous research solicitations) for ongoing multiple-year awards are no longer required at the time that new proposals are due. Instead, a single *Annual Progress Report* will be due no later than 60 days in advance of the anniversary date of the award and is to be submitted as an attachment to an E-mail message to the Program Officer for this program. Note that as an additional change from past practice, a revised budget for any remaining years of an approved award is neither necessary nor expected; the multiple year budget approved at the time of the original award is considered binding barring the development of unforeseen, extreme issues (see Section D.4 of Appendix D of the *Guidebook for Proposers* for further details).

IMPORTANT INFORMATION

- As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) now uses a unified set of instructions for the preparation and submission of proposals given in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement - 2003* (or *NASA Guidebook for Proposers* for short) that may be accessed by opening http://research.hq.nasa.gov/ and linking through "Helpful References," or by

direct access at http://www.hq.nasa.gov/office/procurement/nraguidebook/ (note that the updated 2003-edition of the *Guidebook* is used for this solicitation).

- Section 6 of this NRA's *Summary of Solicitation* contains the Web address relevant to the electronic submission of a Notice of Intent (NOI) to propose and a proposal's *Cover Page/Proposal Summary/Budget Summary*, as well as the mailing address for the submission of the hard copies of a proposal.

Questions about this program element may be directed to the PG&G Program Officer:

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Solar System Exploration Division
Code SE
Office of Space Science
NASA Headquarters
Washington, DC 20546
Telephone: (202) 358-0294
E-mail: Steven.Saunder-1@nasa.gov